EPA Region 7 TMDL Review

TMDL ID:	IA 04-LDM-01995-L	**Waterbody ID:**	IA 04-LDM-01995-L
Waterbody Name:	Williamson Pond		
Tributary:	English Creek		
Pollutant:	Turbidity		
State:	IA	**HUC:**	0710000901
BASIN:	Des Moines River Basin		
Submittal Date:	December 15, 2005		
Approved:	Yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

The TMDL for Williamson Pond was formally submitted by the Iowa Department of Natural Resources (IDNR) in a letter received by EPA on December 19, 2005.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

The loading capacity is set for suspended sediment and phosphorus. The relationship between the targeted pollutants (sediments and phosphorus) and the turbidity impairment were identified through the use of the Trophic State Index (TSI). To address the identified pollutant (turbidity) a TSI value of 65 for Secchi depth, and a TSI value of 70 to total phosphorus (TP) has been targeted to limit the sediment load and improve the effect on water transparency. This TMDL will result in a 78% reduction in sediment loading and a 65% reduction in total phosphorus loading which should result in attainment of applicable water quality standards.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Designated uses of Williamson Pond are primary contact recreational use (Class A1) and aquatic life use (Class B(LW). In 1998, Williamson Pond was included on the impaired waters list due to turbidity and organic enrichment. In 2002, this impairment was changed to turbidity only. Impairments at Williamson Pond to the Class A1 (primary contact) use is due to reductions in water quality clarity caused by primarily by moderately high levels of inorganic turbidity cased by suspended sediments. This is a violation of the narrative water quality standards stating that waters shall be free from aesthetically objectionable conditions.

For turbidity the impairment is based on narrative standards which state that Williamson Pond shall be "free from materials attributable to wastewater discharges or agricultural practices producing objectionable color, odor, or other aesthetically objectionable conditions." The presence of suspended sediment, limits the clarity and is linked to total phosphorus loading through the use of Carlson's Trophic State Index (TSI). Sediment and nutrients (phosphorus) from nonpoint sources and internal recycling has been identified as causing the turbidity impairment. Therefore, TSI values have been set for Secchi depth transparency (SD) and total phosphorus (TP). The target is a TSI(SD)<65 and a TSI(TP)<70, which should result in a Secchi depth of 0.7 meters.

Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The linkage for turbidity is defined through Carlson's TSI values. Since the state does not have numeric water quality criteria for turbidity the TMDL uses the surrogate measure of TSI which links the relationship between TP and water transparency with turbidity conditions. Sediment and nutrients from the watershed or resuspended from within the lake are causing increased turbidity and may cause increased algal blooms. Therefore, the TMDL is targeting both sediment loads and phosphorus loads. Phosphorus is being targeted because there may be impacts due to increased light penetration which could lead to increased algal blooms. Growing season mean (GSW) in-lake total phosphorus concentrations are used to calculate an annual average total phosphorus loading. To achieve a lake phosphorus TSI of 70, the phosphorus loading capacity of Williamson Pond was based on the Vollenweider 1982 Shallow Lake and Reservoir Model. Reductions in total phosphorus and suspended sediments are expected to result in similar reductions in non-algal turbidity. The load allocations and margin of safety do not exceed the load capacity.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

Sources for suspended sediment and total phosphorus are influenced by nonpoint and in-lake resuspension. There are no point source discharges in the watershed. Nonpoint sources include runoff from row crop agriculture, pastures, prairie grasses, forested areas, and other residential areas. Gross sheet and rill erosion in the Williamson Pond watershed is estimated at 6,930 tons/year. From this, the sediment delivery to Williamson Pond was calculated using RUSLE and land uses derived from the 2002 CIR photography. A current estimate of sediment delivery to Williamson Pond is 1,765 tons/year. The current phosphorus load was determined by using the Vollenweider 1982 Shallow Lake and Reservoir Model. This model estimated current phosphorus delivery at 2,282 lbs/year. It appears all sources of total phosphorus have been considered.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

The load allocation for this TMDL is set at 349 tons/year for sediment and 724 lbs/year for phosphorus.

There are no significant sediment or phosphorus point source contributors in the Williamson Pond Lake watershed. The WLA is zero pounds per year.

WLA Comment

There are no point sources for sediment or phosphorus, the WLA is set to zero.

LA Comment

The load allocation for turbidity 349 tons/year of se.diment in the lake allocated to nonpoint sources, and lake resuspension. The load allocation for phosphorus is set at 724 lbs/year.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The MOS for suspended sediment and total phosphorus is explicit in that the loads were calculated based on in-lake concentrations 10% below the desired endpoint.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

The TMDL was developed based on transparency that will result in attainment of targets for sediment and phosphorus on and average annual basis.

Public Participation

Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

A public meeting was held at the Pin Oak Nature Center on May 16, 2005 to discuss water quality at Williamson Pond and the TMDL process. A second public meeting was held on October 27, 2005 at the Pin Oak Nature Center in Chariton to present and discuss the draft TMDL.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

Monitoring will, at a minimum, meet the data requirements established by Iowa's 305(b) guidelines for a complete water quality assessment. This will consist of three lake samples per year for three years or ten samples over two years. The data will be collected by 2010.

Reasonable assurance

Reasonable assurance only applies when reductions in nonpoint source loading is required to meet the prescribed waste load allocations.

There are no Iowa waste loads included in this TMDL. No allowance for increased pollutant loads was included in this TMDL.